

Sequoyah Fire Protection Baseline Inspection Briefing - April 8, 2002

Report Number: 50-327(328)/02-03

Inspection Dates: March 25-29, 2002

Inspection Type: Triennial Fire Protection Baseline Inspection - (71111.05T dated 3/23/01)

Inspector(s): Eva Brown, RII (Lead Inspector); G. Wiseman, RII; M. Thomas, RII; P. Fillion, RII

Accompanying Personnel: C. Payne, RII

Scope/Objectives: The team selected four risk significant fire areas to verify that the post-fire safe shutdown (SSD) capability and the fire protection features ensured that at least one post-fire SSD success path was maintained free of fire damage. Fire Areas were chosen based on the fire risk ranking in the licensee's IPEEE for fire. Areas chosen for review were:

1. **Fire Area FAA-029, Auxiliary Building, Elevation 690: Auxiliary Building Corridor**

This fire area (FA) includes rooms 690.0-A1, A9, A10, A13, A14, A17, A18, A22, A23, A23a, A24, A27, A30 and A31. This area contains both trains of safe shutdown equipment or cables and is classified as a 10 CFR Part 50 Appendix R, III.G.2 area. Both trains of motor-driven auxiliary feedwater (AFW) pumps are located in this fire area, as well as the cables for both trains of essential raw cooling water (ERCW). The ERCW cables are routed into a metal pull box coated with Pyrocrete in the northeast corner of this FA. In addition all five Component Cooling Water Pumps (CCWP) are within the FA. A significant fire in this area would require shutdown of either unit from the main control room (MCR) using the respective Centrifugal Charging Pump (CCP) 1(2)A-A, the turbine-drive AFW pump and both Residual Heat Removal (RHR) pumps. Fire area FAA-029 has an ignition frequency of 1.11 E-2/yr . The licensee divided the FA into six equally divided areas with each of those six areas have an ignition frequency of 1.85 E-3 . Taking credit for automatic suppression and the fire brigade the fire-induced CDF was determined by the licensee to be approximately 2 E-7/yr .

2. **Fire Area FAA-067, Auxiliary Building, Elevation 734: 6.9kilvolt (kV) Shutdown Board Rooms**

This FA includes rooms 734.0-A2 and A9. This fire area includes both units train 'A' auxiliary electric power switchgear. This area is classified as a 10 CFR Part 50 Appendix R, III.G.2. A significant fire in this fire area would require shutdown of Unit 1 and/or Unit 2 from the MCR and involve the respective units Centrifugal Charging Pumps (CCP) 1(2) B-B, the turbine-drive auxiliary feedwater (TDAFW) pump and the train 'B' residual heat removal (RHR) pumps 1(2)B-B. A significant fire in FAA-067, should it breach the south fire area wall barrier, could result in the loss of redundant train 'B' 6.9-KV essential power in FAA-081, the 6.9kV Shutdown Board Room 'B'. Fire area FAA-067 has an ignition frequency of 9.15 E-03 . The licensee divided the FA into two areas with both areas have an ignition frequency of 4.58 E-3 . Taking credit for automatic suppression and the fire brigade the fire-induced CDF was determined by the licensee to be approximately 5.5 E-7/yr .

3. **Fire Area FAC-009, Control Building, Elevation 685: Unit 1 Auxiliary Instrument Room**

The fire area includes controls to important safe shutdown (S.D.) equipment from the control room. This area is provided with a total flooding low pressure gaseous carbon

NN/3

dioxide system. This area is classified as a 10 CFR Part 50 Appendix R, III.G.3 area. [A significant fire in this area would involve evacuation of the MCR and alternative shutdown from the remote shutdown panel using the Auxiliary Control Room Complex located in the Auxiliary Building. Fire area FAC-009 has an ignition frequency of 7.57 E-3/yr . This zone's fire-induced core damage frequency (CDF) has been assessed at 3.76 E-7/yr .

4. Fire Area FAC-20, Control Building, Elevation 732: Relay Room

The fire area includes high voltage electrical relay equipment for offsite power and is located adjacent to the MCR complex. No automatic fire suppression systems are provided for this area. A significant fire in this area may result in a fire induced loss of offsite power (LOOP). This area is classified as a 10 CFR Part 50 Appendix R, III.G.3 area. A fire in this area would require evacuation of the MCR and alternate shutdown from the remote shutdown panel using the Auxiliary Control Room Complex located in the Auxiliary Building. Fire area FAC-020 has an ignition frequency of 4.5 E-3/yr . This area's fire-induced core damage frequency (CDF) has been assessed at 3.66 E-7/yr .

RESULTS: There were four inspector-identified and two licensee-identified findings. One item was still in review for significance at the close of the inspection. Subsequent inspection suggests that this item may be characterized as [Green]. Two inspector-identified items were exited as non-cited violations. One item was originally exited as an unresolved item (URI) pending inspector review of the licensing basis. The two licensee findings were exited as non-cited violations. Several minor findings were identified.

Minor Findings:

Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

Onshift Familiarity with Plant Fire and Appendix R Procedures

- (02-03552) Issues with operator knowledge of plant fire and III.G.3 Shutdown Procedure

Communications

Availability of Sound Powered Phones

- (02-03510) FSAR credits use of sound-powered phones as backup to radios for alternate shutdown, however sound-powered phones are not present in all the locations identified in the shutdown procedure

Emergency Lighting

Fire Equipment Area Emergency Lighting

- (02-03564) Absence of lighting in Fire Brigade equipment staging area

Cold Shutdown Repairs

Lack of Procedural Steps for Cold Shutdown Repair

- (02-03530) One procedure identified the need to perform "repair," but actual procedural step was nonexistent

Fire Protection Systems, Features and Equipment

Shift Incident Commander Training on AOP-N.08

- (02-03543) SIC not trained on new Main Control Room shutdown procedure

Cardox Floor Drain Loop Seal PM

- (02-03565) Floor drain loop seals in the Auxiliary Instrument Rooms (FAC-020) were not routine verified to be filled with water to prevent CO₂ mitigation to other plant areas

Fire Fighting Effects on the Performance of Electrical Equipment Manipulation

- (02-03566) Water from fire fighting/ sprinklers could migrate into area where manual actions on energized electrical components would be required

Identification and Resolution of Fire Protection Program

Incorrect Categorization of Fire Protection PERs

- (02-02866) adverse conditions requiring outage modifications put in "broke-fix" category D

Unresolved Items:

Credit of Control Air for Normal Letdown in FAA-80

- This issue involves the licensee's failure to maintain a redundant train free from fire damage for alternate letdown. The licensee stated that "[t]he EGTS room...contains cables for all four acceptable combinations of PORVs, Block Valves, and RVHV Valves in such a manner that safe shutdown cannot be guaranteed using the Alternate Letdown Path." Normal and Excess Letdown are not available in this scenario due to the licensee not crediting control air for compliance with Appendix R. The licensee identified in PER 02-575 that redundant Alternate Letdown cables were not protected in accordance with Appendix R III.G.2. Their solution was to chose an alternate method for letdown which required crediting control air. At the conclusion of the inspection, it was unclear whether licensing documentation credited control air. Based on our review last week and discussions with C. Casto, I am proposing to close the URI and issue an NCV based on the failure to comply with III.G.2 (Green). To date the licensee has not provided assurances that control air would be available (review of potential heat release rate in the event of a fire).

Licensee Identified Findings:

10 CFR 50 Appendix R III.G.1 and III.G.2 states in part that:

G. Fire protection of safe shutdown capability.

1. Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:

- a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and
- b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

2. Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;

10 CFR 50 Appendix III.J states that:

J. Emergency lighting.

Emergency lighting units with at least an 8-hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

Inadequate Protection Against Spurious Operation of VCT suction valves

- A fire could result in a spurious closure signal to the VCT level control valves. As the power cables for the RWST suction valves are in the same fire area and not protected "...an interaction exists such that suction to both the VCT and RWST could be lost." (Green - 10 CFR 50 Appendix R III.G.2)

Inadequate Emergency Lighting for RWST Isolation valve

- The licensee identified that the "...manual actions specified for the closure of valve 1,2 FCV-63-0001 did not alert the operator to the potential for requiring local manual operation of the valve. Additionally, emergency lights have not been provided for local operation." The licensee indicated that the failure to isolate the valve could allow the contents of the RWST to drain into the containment sump. (Green- III.J)

Potential Finding:

Potential Finding - Initiating Events

- Coordination between the neutral overcurrent and the ground relays was not adequate. This inadequacy increased the likelihood of dual unit trip due to improper transfer of a fault from one unit to the other. (Green)

Inspector Identified Findings:

Protection of 1(2) FCV-62-90(91) cabling in accordance with III.G.2

- During the walkdown of selected components in Fire area FAA-029, inspector identified the failure to have adequate protection or separation for Normal Charging Isolation in accordance with III.G.2. Based on review of the applicable fire protection shutdown procedures, the licensee credited manual actions in lieu of compliance with III.G.2. (Green - III.G.2)

Fire Procedure Transitional Errors

- During course of review of the licensee shutdown procedures the inspector noted various errors which elicited questions whether transitions to shutdown procedures would occur in a timely fashion due to identified deficiencies. In event of a severe fire there are three primary procedures. For initial fire response, the licensee would use AOP-N.01. If fire becomes severe and requires shutdown from the Main Control Room they would use AOP-N.08. However, if the fire becomes severe and shutdown is required from outside the Main Control Room they would use AOP-C.04. To verify whether operator training was adequate to cover procedural inadequacies, the inspectors performed a walk-down of the procedures using a fire scenario for one of the selected areas. The inspectors questioned onshift operators and the answers revealed poor transitions between procedures (AOP-N.01 and AOP-N.08) and unfamiliarity with procedure (AOP-N.08). In one instance the SRO decided to use both sections of AOP-N.08. However this was inappropriate due to available AUO staffing (10 needed versus 7 onshift). In addition there were issues identified with AOP-C.04, which included the lack of a step for transition from AOP-N.01 to AOP-C.04. The procedure actually required entry into AOP-N.08 to procedurally get to AOP-C.04. (Green - TS 6.8.1.a)

Sequoyah Inspection Lessons Learned (Successes [+] and Challenges [-]):

- (+) Mid-week meeting with Engineering Manager allowed licensee management to focus effort
- (+) Pre-inspection material provided electronically (CD)
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- (+) Operator -Licensing Inspector During Procedure Walkthrough
- (+) Pre-inspection material provided electronically (CD)
- (+) Daily Team Meetings
- (+) Electrical and FP Inspector on Walkdown
- (-) Communications
- (-) Obtaining Needed Documentation - Computer Access -Internet -Links
- (-) Confusion on what constitutes a performance issue
- (-) Additional Licensee Performance Issues